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FULL PAPERS

Glasgow's Buzzing pollinator survey results

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INTRODUCTION

Over 97% (more than 3,000,000 hectares) of flower-rich grassland have been lost in the UK since the 1940's through agricultural intensification to produce more home-grown food, and through wider development of housing, transport infrastructure and industry. These flower-rich areas are vital habitats for many invertebrate species and are particularly important to pollinating insects such as bees, butterflies and hoverflies. The loss of wildflower meadows across Britain has resulted in a massive decline in pollinators as well as other invertebrate species. Over 250 species of pollinating insects in the UK are in danger of extinction and are on the UK Biodiversity Action Plan (UKBAP) priority species list.

Buglife has joined forces with Land and Environmental Services - Glasgow City Council to transform mown grassland in urban areas into colourful and wildlife-rich wildflower meadows that will benefit a whole range of invertebrate species. This three year project started in May 2011 and is funded by the Landfill Communities Fund. Wildflower meadows have been created and/or enhanced in at least 13 parks through the sowing of seed and planting of plug plants of native species of wildflower that are of known provenance. This has significantly increased wildflower species diversity within the parks providing habitat for a range of invertebrates and other wildlife such as small mammals, birds and amphibians.

PROJECT SURVEYS

During each year of the project, Buglife has undertaken invertebrate surveys at the parks before and after meadow creation and/or enhancement. These surveys concentrated on pollinating insects such as bees and wasps (Hymenoptera), hoverflies (Diptera: Syrphidae) and butterflies and moths (Lepidoptera), but other invertebrate species found during the surveys were also recorded including beetles (Coleoptera), grasshoppers (Orthoptera), true bugs (Hemiptera) and spiders (Araneae).

METHOD

Over the project, a total of 13 parks have been surveyed for pollinators during a single site visit in August 2011, 2012, 2013 and 2014, though not all parks were surveyed every year (Table 1).

Table 1. Parks surveyed in August 2011, 2012, 2013 and 2014 with the grid references of the meadow that was surveyed for invertebrates.

Park Name	Grid Reference	2011	2012	2013	2014
Alexandra Park	NS619657			✓	✓
Auchinlea Park	NS666662			✓	✓
Bellahouston Park	NS545635		✓	✓	✓
Botanic Gardens	NS566676		✓	✓	✓
Cranhill Park	NS644655, NS645654	✓	✓	✓	
Glasgow Green	NS602638, NS597642	✓	✓	✓	
Hogganfield Park	NS6467	✓	✓	✓	
Kelvingrove Park	NS568663, NS569663	✓		✓	✓
Linn Park	NS583589, NS585594	✓	✓	✓	
Pollok Country Park	NS557619, NS548620		✓	✓	✓
Queen's Park	NS577619			✓	
Trinley Brae	NS533700	✓	✓	✓	
Victoria Park	NS539671		✓	✓	✓

Table 2. Species recorded during pollinator surveys that are new to Glasgow, including the park they were collected from, the month and year, notes on how they were identified and the sex of the specimen (if known). Park abbreviations: Alexandra Park: Alex, Auchinlea Park: Auch, Cranhill Park: Cran, Glasgow Green: Glas, Hogganfield Park: Hogg, Kelvingrove Park; Kelvin, Linn Park: Linn, Pollok Country Park: Pollok, Queen's Park: Queen, Trinley Brae: Trin, Victoria Park: Vic.

Order	Species	Park (abbreviation)	Date	Notes
Hymenoptera	*Andrena denticulata* (Kirby 1802)	Trin	August 2012	Female, identified by Murdo Macdonald from Highland Biological Recording Group
	Megachile centuncularis (Linnaeus 1758)	Linn	August 2012	Female, identified by Murdo Macdonald from Highland Biological Recording Group
	Sphecodes geoffrellus (Kirby 1802)	Alex, Kelvin	August 2013	Female, identified using draft key by Else, 1999
Coleoptera	*Galeruca tanaceti* (Linnaeus 1758)	Linn	September 2012	Several gravid females observed and one male collected; Cox, 2007; Hubble, 2012
Hemiptera	*Chlamydatus pullus* (Reuter 1871)	Cran	August 2013	Identified using British Bugs website
	Deraeocoris flavilinea (A. Costa 1862)	Hogg	August 2013	Identified using British Bugs website
	Lopus decolor (Fallèn 1807)	Trin	August 2013	Identified using British Bugs website
	Lygocoris pabulinus (Linnaeus 1761)	Alex	August 2013	Identified using British Bugs website
	Lygus rugulipennis (Poppius 1911)	Alex, Auch, Cran, Glas, Hogg, Kelvin, Linn, Pollok, Trin	August 2013	Several individuals recorded at each park; Nau, 2004
	Orthops campestris (Linnaeus 1758)	Glas	August 2013	Identified using British Bugs website
	Plagiognathus chrysanthemi (Wolff 1804)	Kelvin, Pollok, Queen, Trin	August 2013	Identified using British Bugs website
	Stenodema calcarata (Fallèn 1807)	Glas, Hogg, Linn, Trin	August 2013	Identified using British Bugs website
	Stenodema holsata (Fabricius 1787)	Alex, Auch, Hogg, Linn, Pollok, Vic	August 2013	Identified using British Bugs website
	Stenodema laevigata (Linnaeus 1758)	Auch, Glas, Hogg, Trin	August 2013	Identified using British Bugs website
	Javesella pellucida (Fabricius 1794)	Linn	August 2013	Identified using British Bugs website
	Stenocranus minutus (Fabricius 1787)	Kelvin	August 2013	Identified using British Bugs website
Araneae	*Larinioides cornutus* (Clerck 1757)	Hogg	August 2012	Two males; Lockett and Millidge, 1978; Roberts, 1996

Each site survey involved the surveyor walking a transect across the meadows at each park to collect invertebrates. A sweep net was used to collect invertebrates from vegetation, particularly from flower heads. The net was swept over vegetation in a figure of eight for one minute during a transect; larger meadow areas such as those at Hogganfield Park and Trinley Brae had several transects completed across the site during a survey. Specimens collected in this way were either put into a pot with 70% ethanol to be identified later or, if they could be identified by the surveyor at the park, the specimen was later released.

Identification of several species of bees and wasps, butterflies and moths and hoverflies was made through direct observation of specimens visiting wildflowers or in flight during a site survey. Sweep nets were sometimes used to aid in identification of a species which could then be released. Other species identified through direct observations included grasshoppers and some beetles.

RESULTS

Pollinator surveys over the project have recorded a total of 139 species of invertebrate across the 13 parks and this includes several that are possibly new to the Glasgow area; due to the incompleteness of information in the British Records Centre there is some uncertainty, especially amongst the Hemiptera. (Table 2).

DISCUSSION

After sending all invertebrate records for the Glasgow Buzzing project to Richard Weddle, manager at Glasgow Records Centre, it is thought that a total of 17 species recorded during the project are new to the Glasgow area. This list includes several true bugs as well as three species of solitary bee.

The leafcutter bee *Megachile centuncularis* and leaf beetle *Galeruca tanaceti* were both recorded in the same area of established meadow at Linn Park that was extended and further enhanced through this project. Surveys at this park in the first year of the project and before meadow enhancement recorded a total of 20 species of invertebrates, which increased to 43 species recorded after meadow enhancement. A total of 55 species of invertebrate were recorded in the meadows at Linn Park over the project.

Hogganfield Park had the highest total number of invertebrate species recorded (71) and this includes several that may be new to Glasgow (Table 2); 26 species of invertebrate were recorded in year one of the project, 27 species in year two and 60 species in year three. Cranhill Park, which is just south of Hogganfield Park, had the lowest total number of species recorded over the three years (30), including two species that may be new to Glasgow (Table 2); 14 species of invertebrate were recorded in Cranhill Park in year one, 16 in year two and 14 in year three.

The most significant increase in species recorded in the parks after meadow creation was at Glasgow Green. Surveys of the sites selected for meadow creation within the park before habitat work occurred resulted in only the common wasp (*Vespula vulgaris*) being identified. Since the meadow was created, a further 30 species have been recorded in August 2012 and 2013, including small copper (*Lycaena phlaeas*) and a female common green grasshopper (*Omocestus viridulus*), which was observed ovipositing. The increase in species recorded at Glasgow Green over the project as well as the high number of species recorded at Hogganfield Park and Linn Park highlights the importance of wildflower meadows for a range of invertebrate species.

Copies of reports written throughout the project, including species records can be obtained either from Buglife or through the website: www.buglife.org.uk/ .

All collected invertebrate specimens are kept at the Buglife office in Balallan House, Stirling.

ACKNOWLEDGMENTS

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ELECTRONIC SOURCES

Bees, wasps and ants recording society; http://www.bwars.com/ last accessed October 2014.

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